

## Radionuclide Absorption Demonstration System

Completed Technology Project (2016 - 2017)



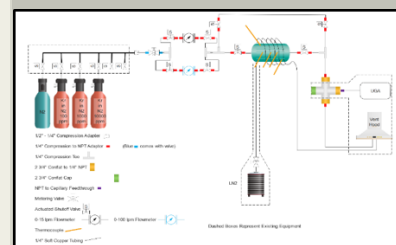
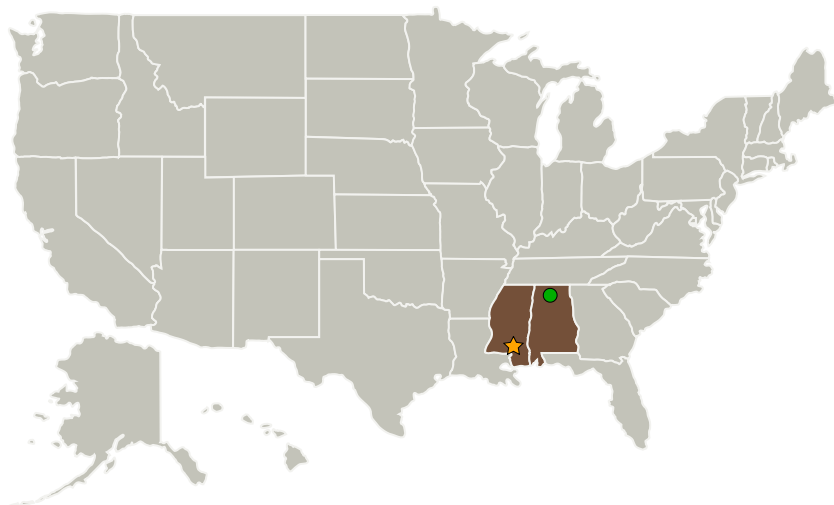
## Project Introduction

After a nuclear thermal rocket (NTR) is test fired, the engine's reactor is operated in a cool-down mode during which radioactive exhaust by-products continue to be made, yet at a much lower rate. Extended operation of a Thermal Propulsion Capture System (TPCS) where all exhaust products are totally contained will be uneconomical during that longer term cool-down phase. Instead, a Regenerative Radionuclide Adsorption and Disposal System (RRAADS) could be implemented to trap radioactive emissions. This project built and tested a small scale demonstration system to verify that development of the technology is feasible.

## Anticipated Benefits

This effort is validating existing analytical models and enabling implementation of an operational RRAADS for the cool-down cycle of the NTR TPCS. This technology will further decrease any radioactive product releases to the environment to very low levels during the cool-down phase and provide benefit to the larger nuclear power industry as well.

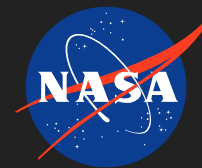
## Primary U.S. Work Locations and Key Partners



Schematic of the test system implemented by USM for nitrogen and helium balance gas flows

## Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3



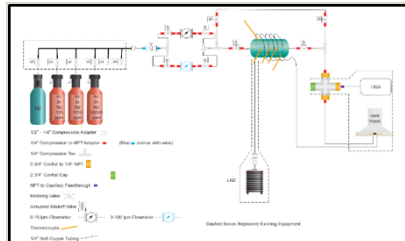
## Completed Technology Project (2016 - 2017)

Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
●Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
University of Southern Mississippi	Supporting Organization	Academia	Hattiesburg, Mississippi

## Primary U.S. Work Locations

Alabama	Mississippi
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## Images



## Project Image

Schematic of the test system implemented by USM for nitrogen and helium balance gas flows (<https://techport.nasa.gov/image/35797>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

## Stennis Space Center (SSC)

**Responsible Program:**Center Innovation Fund: SSC  
CIF

## Project Management

**Program Director:**

Michael R Lapointe

**Program Manager:**

Ramona E Travis

## Principal Investigator:

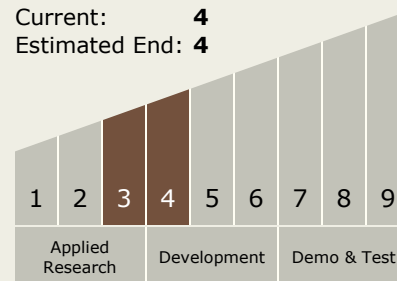
Glen A Guzik

## Technology Maturity (TRL)

Start: **3**

Current: **4**

Estimated End: **4**



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## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - └ TX01.4 Advanced Propulsion
    - └ TX01.4.3 Nuclear Thermal Propulsion

## Target Destinations

Mars, Others Inside the Solar System